

ON THE GENUS *VOLUTOCORBIS* WITH DESCRIPTIONS
OF TWO NEW SPECIES FROM SOUTH AFRICA

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In the last few years I have received new material of the genus *Volutocorbis* from Mrs. Helen Boswell of Valhalla, Transvaal, South Africa, and from Mr. Kenneth J. Fuller of Lambton, Germiston, Transvaal. Among them are specimens of three new species, two described in this paper, and one described in a previous paper in this issue of *The Nautilus* (vol. 88, no. 2). In a loan of several interesting species of marine mollusks from the Natal coast, sent to me by Richard N. Kilburn of the Natal Museum, Pietermaritzburg, were specimens of two of the new species described in these papers. To all these correspondents I give my grateful thanks.

Darragh (1971) has questioned the propriety of regarding this genus as distinct from *Athleta* Conrad, 1853, and *Volutospina* Newton, 1906. In this respect he follows the conclusions reached by Cossmann (1909, p. 210), who suggests that *Volutocorbis*, *Volutospina* and *Neoathleta* Bellardi, 1890, should be considered junior synonyms of *Athleta* Conrad, 1853, because he felt that in sculptural characters and general shape there were species that represented transitional stages between these groups that he had at one time considered of sectional rank. In support of this viewpoint he cited the work of

Burnett Smith (1906) on the races of *Volutilithes petrosus* Conrad, 1853.

Both Cossmann and Darragh with justice depreciate the importance of the size and number of whorls of the protoconch as a basic character in classifying the Volutidae. Cossmann complained that Dall overemphasized the generic significance of the nuclear whorls while ignoring the characters of the columellar folds (Cossmann, 1907, p. 191). Earlier, Cossmann (1899, p. 101) in discussing his classification of the Volutidae had stressed the necessity of utilizing all characters found in the shells.

In the process of reviewing the problem of the proper allocation of the group *Volutocorbis* I decided to use this occasion to reorganize and arrange the Cenozoic members of the family Volutidae present in the National Museum of Natural History. I had, therefore, the opportunity of examining hundreds of specimens from both Europe and the United States, which I attempted to arrange according to what I considered a logical classification. Particular attention was paid to the representatives of the subfamily Athletinae. Needless to say, the conclusions arrived at, and which I outline in the following paragraphs, are in a sense prelim-



FIGS. 1-4 *Volutocorbis nana* Rehder, new species: FIGS. 1, 3, holotype, USNM 709351,



23.5 mm. in length. FIGS. 2, 4, paratype, Fuller Colln., 20.6 mm. in length.

inary, and should be considered as suggested guideposts in future, more detailed phylogenetic studies similar to the excellent one published by Fischer, Rodda, and Dietrich (1964). It is to be hoped, however, that these studies will involve related species and genera from other faunal areas, on both sides of the Atlantic.

Darragh in his study makes only occasional references to the columellar plaits found in members of the groups under discussion, emphasizing primarily the characters of the protoconch and external sculpture. I believe that the folds on the columellar can be utilized in arriving at a satisfactory classification provided one considers their basic characters and is not led astray by minor details.

I consider *Athleta* Conrad, 1853, whose type-species is *Voluta rarispina* Lamarck, 1811, of the Miocene of France, to be distinct from the *Volutospina* — *Volutocorbis* complex. The columellar folds are stouter, with two lowermost ones equal or subequal in strength, the upper one of the two frequently the stronger. On opening the shell behind the aperture three ascendant plaits are seen on the columella, the upper one usually less prominent than the other two. The early post-nuclear whorls may be cancellate or with axial ribs crossed by spiral grooves. The protoconch is turbate or mammillate with several smooth whorls. Synonyms are *Eoathleta* Gardner, 1945, and *Volutovetus* Pilsbry and Olsson, 1954. Based on the figure and description *Bendeluta* Eames, 1957, may also for the time being be placed in the synonymy of *Athleta*.

The genera *Volutocorbis* Dall, 1890 (type-species *V. limopsis* (Conrad)) and *Volutospina* Newton, 1906 (type-species *V. spinosa* (Linné)) are very closely related. Both groups have the columellar folds rather steeply ascending with the most anterior one the strongest and the posterior varying greatly in number and sometimes on a more or less prominent columellar pad. In sculpture and shape one can find among the European Eocene species an almost complete gradation from *V. spinosa* (Linné, 1767) through

luctator Solander in Brander, 1766 — *scalaris* Sowerby, 1843 — *ambigua* Solander in Brander, 1766 — *suturalis* Nyst, 1836 — *crenulifer* Bayan, 1870, to *digitalina* Lamarck, 1811, a species close to the type species of *Volutocorbis*. It is therefore difficult to determine the limits of these groups, and therefore for the present I consider *Volutocorbis* Dall as the generic name to be used, with *Volutospina* Newton as a junior synonym. As Darragh points out some of the recent South African species I have described resemble closely the Miocene species *V. suturalis* Nyst, 1836.

Notoplejona Marwick, 1926, seems to be a genus rather variable in sculpture, judging from the literature and the two specimens I have been able to examine in the collection here. The nature of the columellar folds and the characters of the sculpture lead me to place it near *Volutocorbis* but as a distinct subgenus because of the strong parietal callus and broad anterior siphonal notch.

I have been unable to examine a specimen of *Voluta affinis* Brocchi, 1814, the type-species of *Neoathleta* Bellardi, 1890, but the figure given by Brocchi shows a species that seems to belong in *Volutospina* (i.e. *Volutocorbis*). Cossmann states that *affinis* is congeneric with *Voluta cithara* Lamarck, 1811, the type-species of *Volutopupa* Dall, 1890, which, judging from the figure of *affinis*, seems unlikely. Until the protoconch of *V. affinis* can be examined and described, I am inclined to add *Neoathleta* to the synonyms of *Volutocorbis* Dall, 1890. Unfortunately, the date of publication of *Neoathleta* Bellardi is 6 April 1890, while that of *Volutocorbis* Dall is August 1890, so that *Neoathleta* would replace *Volutocorbis* as a generic name, if my surmise on the allocation of *affinis* is correct. However, because of the present uncertainty as to the nature of the protoconch of the species, I am continuing to use *Volutocorbis*, and consider *Neoathleta* to be a *genus inquirendus* for the present.

Dall, in 1890, proposed the name *Volutopupa* as a section of *Volutolithes* for a group of species with a high, many-whorled, relatively large protoconch, citing as type

Voluta cithara Lamarck. This name, as stated above, Cossmann placed in the synonymy of *Neoathleta* Bellardi, and included in the group a number of Paris Basin species, some of which undoubtedly do not belong here. The only one that is definitely congeneric with *V. cithara* is *lyra* Lamarck, and *V. lineolata* Deshayes also is probably a *Volutopupa*. I have examined the protoconch of *V. bulbula* Lamarck, 1803, and find that it possesses a small, conical protoconch with few whorls, and thus should be placed in *Volutocorbis*. *Volutopupa* can be retained as a subgenus of *Volutocorbis* for those species with a relatively large, elevated-conical, multispiral protoconch, and a rather thin shell with a more or less inflated last whorl.

The Australian species, that Darragh places in *Athleta* (*Ternivoluta*), and of which I have been able to examine several lots of *antiscalaris levior* (McCoy, 1866) and *anticingulata* McCoy form *indivisa* McCoy, 1866, I would place in the "*Volutospina* section" of *Volutocorbis*.

Ternivoluta Martens, 1897, is definitely worthy of subgeneric rank under *Volutocorbis* because of its large, paucispiral, deviated protoconch. The Australian Eocene to Miocene species that Darragh placed in *Ternivoluta* belong in *Volutocorbis* since they possess a protoconch typical of this group and the posterior columellar folds are not placed on a columellar pad that is generally found in *Ternivoluta*.

***Volutocorbis nana* Rehder, new species**

Figs. 1-4

Diagnosis — Shell small, with strong axial ribs and obscure spiral sculpture, a thick outer lip, and four to five folds on the columellar wall. Closest to *V. gilchristi* (Sowerby, 1902), which is strongly subsuturally channeled, with stronger spiral sculpture, and more pronounced columellar folds.

Range — Off southern Zululand, Natal, South Africa, in 160-180 fathoms.

Description — Shell small, 20.6 to 23.5 mm (3/4 to 7/8 inches) in length, ovate, rather stout, color of dead shells dull ivory white.

Protoconch depressed-mammillate, of about 1½ smooth whorls, early postnuclear whorls marked by rather sharp axial riblets, 20 in second postnuclear whorl, marked by two increasingly prominent nodes, one subsutural and the other stronger; the narrow platform-like subsutural ramp and the strong nodes at the shoulder give the early postnuclear whorls a stepped appearance; in the penultimate and ultimate whorls the subsutural ramp becomes gradually more inclined and the subsutural row of nodes less angulate. The last whorl with 16 and 18 axial ribs in the two specimens seen, showing obscure minor nodes below the shoulder, marking the presence of obscure spiral ridges, which continue anteriorly to the neck where they become rather strong cords; in the mid-portion of the last whorl they are visible only as very faint nodes on the ribs. Aperture narrow; outer lip gently arcuate, broad, thickened internally, and varicose, possibly obscurely denticulate in fresh specimens; inner lip weakly angled at juncture of parietal and columellar portions, the latter with 7 or 8 low rounded folds of varying strength, the anteriormost one the largest. Parietal callus thin, obscure.

Material — Holotype: off coast of southern Zululand, Natal, in 160-180 fathoms, attached to *Xenophora pallidula* Reeve, USNM 709351. Paratype: same locality as holotype; also attached to *Xenophora pallidula* Reeve; Fuller Collection.

Measurements (mm)—

	length	width	no. whorls
Holotype	23.5	12.5	6¼
Paratype	20.6	11.0	6

Remarks — This species is distinct because of its small size (the holotype has the same number of whorls as the holotype of *V. semirugata* Rehder and Weaver, 1974, measuring 45.1 mm, almost twice as long), relatively strong axial riblets, without obvious spiral sculpture on the upper parts of the whorls, and the thickened, varicose outer lip.

***Volutocorbis mozambicana* Rehder, 1972**
1972. *Volutocorbis mozambicana* Rehder.
The Veliger, vol. 15, p. 12, figs. 3-5, 7-9.

I have recently received a specimen of this species trawled off Durban, which extends the previously known range of this species southward for 650 miles.

Through the kindness of Mr. Richard N. Kilburn I have been able to examine the holotype of *Volutocorbis glabrata* Kilburn, 1971. This species is somewhat larger, with a relatively shorter spire, and a last whorl which is smooth rather than strongly sculptured as in *mozambicana*; the whorls lack the subsutural shelf seen in the latter species.

Volutocorbis kilburni Rehder, *new species*

Figs. 5-8

Diagnosis — Shell smooth except for very faint, obscure, irregular spiral threads, and with a pronounced and narrowly canaliculate suture. Outer lip moderately thickened and recurved, narrowly varicose externally.

Range — From off Ilha Bazaruto, Inhambane, Mozambique, to off Durban, Natal, South Africa in 180 to 280 fathoms.

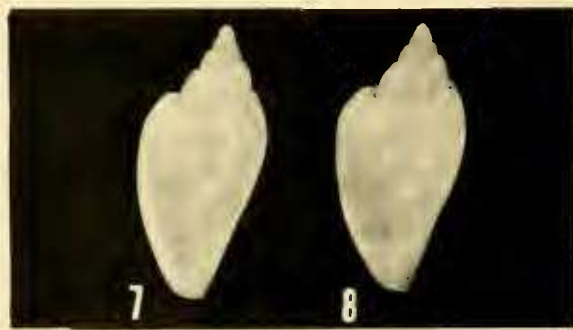
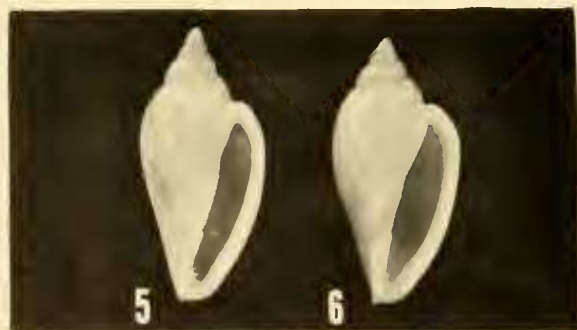
Description — Shell of medium size, 33 to 39.2 mm ($1\frac{1}{4}$ to $1\frac{1}{2}$ inches) in length, ovately obconical with evenly convex whorls separated by a deeply impressed suture. Color dark grayish yellow (Kelly and Judd, 1965; color No. 91), the body whorl with distant reddish brown spots below the suture, occasionally prolonged into streaks, and with obscure pale maculations over the whole whorl, these becoming darker and more or less arranged in spiral bands towards the apertural outer lip; the bands mark the varix of the outer lip with rectangular maculations. Protoconch conical-mammillate, consisting of

$2\frac{1}{4}$ smooth convex whorls with impressed suture. Early postnuclear whorls with flattened subsutural shelf which gradually becomes convex as the suture deepens and becomes canaliculate. Postnuclear whorls rather high and weakly convex, resulting in a rather narrowly conical spire; whorls smooth, without sculpture, except for very weak, obscure spiral ridges and irregular growth ridges. Aperture narrowly elongate, outer lip gently arcuate, thickened and reflected, smooth; inner lip rather straight, only slightly angled at juncture of parietal and columellar portions; columellar lip with a thickened callus on which are situated 9 to 12 folds, the 7 to 10 upper or posterior ones separated from the two anterior ones by a more pronounced gap; of the latter two the posterior one is large, the anterior one low and broad. Siphonal canal rather broad and open. Parietal callus very thin.

Material — Holotype: 15 miles off Durban, Natal, in 280 fathoms; USNM 709352. Paratype No. 1: 10-15 miles off Durban, Natal, in 280 fathoms; Boswell Collection. Paratype No. 2: off Ilha Bazaruto, Inhambane, Mozambique, in 180 fathoms; ex A. Visage; Natal Museum Moll. No. 9769.

Measurements (mm) —

	length	width	no. whorls
Holotype (USNM 709352)	39.2	18.3	$6\frac{1}{4}$
Paratype #1 (Boswell Colln.)	38.1	18.5	$6\frac{1}{4}$
Paratype #2 (Natal Museum Moll. 9769)	33.0	15.1	$6\frac{1}{8}$



FIGS. 5-8. *Volutocorbis kilburni* Rehder, *new species*: FIGS. 5, 7, holotype, USNM 709352,

39.2 mm. in length. FIGS. 6, 8, paratype, Boswell Colln., 38.1 mm. in length.

Remarks — This distinctive species is not close to any known forms of *Volutocorbis*. Paratype No. 2, from off Mozambique, is an immature specimen with a thin, not fully formed outer lip.

This species is named for Mr. Richard N. Kilburn of the Natal Museum, Pietermaritzburg, Natal, in appreciation of his important contributions to our knowledge of the molluscan fauna of this part of the South African coast.

LITERATURE CITED

- Cossmann, M. 1899. Essais de Paléoconchologie Comparée. Livr. 3: 201 pp., 8 pls.
- Cossmann, M. 1907. [Review of] A Review of the American Volutidae, by W. H. Dall. *Revue Crit. Paléozoologie* 11: 191.
- Cossmann, M. 1909. Essais de Paléoconchologie Comparée. Livr. 8: 248 pp., 4 pls.
- Darragh, T. A. 1971. Revision of the Australian Tertiary Volutidae (Mollusca: Gastropoda). 1. The subfamily Athletinae. *Jour. Malac. Soc. Australia* 2 (2): 163-185, pls. 14-16, text figs. A-C.
- Fischer, W. L., P. U. Rodda, and J. W. Dietrich. 1964. Evolution of *Athleta petrosa* stock (Eocene, Gastropoda) of Texas. *Bur. Econ. Geol., Univ. Texas Publ.* No. 6413: VI+ 117 pp., 11 pls., 33 text-figs.

BOOK REVIEW

INTERTIDAL MOLLUSKS OF IQUIQUE, CHILE. By Marincovich, Louie. Los Angeles County Natural History Museum, Science Bull. 16, 49 pp., 102 figs. Feb. 20, 1973. Available from Los Angeles County Museum Bookshop, \$2.35 (postpaid, including tax).

Although the west coast of South America was early explored and the first mollusks from there were described as long ago as 1782, the fauna has remained rather sketchily represented in most collections. Literature is scanty and scattered. The present work results from two collecting trips, comprising a total of six months of intertidal collecting. Some 87 molluscan species and one brachiopod are

discussed, all being well illustrated by photographs and by line drawings of radulae (except for five forms that are specifically unidentified). One new genus, *Salitra*, is proposed in the family Columbelloidea. The type species, *S. radwini*, also is new. Ten other new species are described, in the genera *Nucula*, *Lyonsia*, *Tricolia*, *Eatoniella*, *Eatonina*, *Fartulum*, *Aesopus*, and *Iselica*.

The systematic account is well documented, and the utility of the paper is increased by discussion of biogeography and by a review of pertinent literature. The author is to be commended for this useful work.

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